



4-26-4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/717,218  
Applicant: : Roark et al.  
Filed: : November 19, 2003  
Group Art Unit : 1724  
Examiner: : Not assigned

Confirmation No.: 6026

Docket No. : 63-03  
Customer No. : 23713

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as Express Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

On 4/23/04 Lea Murray  
Lea Murray

EV 374 615 194 US  
Express Mail Certificate Number

INFORMATION DISCLOSURE STATEMENT

Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

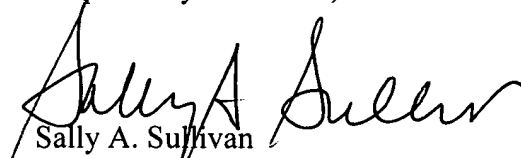
Sir:

The Examiner is respectfully requested to consider the references, copies enclosed, which may qualify as prior art. For the Examiner's convenience, the references are listed on the attached Patent and Trademark Office form PTO-1449.

Where the month of a reference is not listed, the year of publication is sufficiently earlier than the effective U.S. filing date so that the particular month of publication is not an issue.

References known to the applicants have been listed on PTO-1449. That information is cited in a spirit of forthrightness and cooperation to enable the applicants to obtain that measure of protection for the invention to which there is entitlement. However, no representation is made that the listed art actually qualifies as prior art under the patent statute and the mere use of PTO-1449 is not an admission that all listed references are prior art. No representation is made that applicants know of the best art.

Respectfully submitted,

  
Sally A. Sullivan  
Reg. No. 32,064

GREENLEE, WINNER AND SULLIVAN, P.C.  
5370 Manhattan Circle, Suite 201, Boulder, CO 80303  
Telephone: (303) 499-8080; Facsimile: (303) 499-8089  
Attorney Docket No. 63-03  
lem: April 23, 2004

Form PTO-1449		
ATTY DOKKEPNO. 63-03	SERIAL NO. 10/717,218	FILING DATE November 19, 2003
APPLICANT Roark et al.	GROUP 1724	

APR 23 2004

## U.S. PATENT DOCUMENTS

Exmr. Initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	2,924,620	02/25/58	De Rosset	183	2	
	2,958,391	11/01/60	De Rosset	183	2	
	3,350,846	11/07/67	Makrides, et al.	55	16	
	3,393,098	07/16/68	Hartner et al.	136	86	
	4,313,013	01/26/82	Harris	585	818	
	4,468,235	08/28/84	Hill	55	16	
	4,496,373	01/29/85	Behr et al.	55	16	
	4,536,196	08/20/85	Harris	55	16	
	4,589,891	05/20/86	Iniotakis	55	158	
	4,689,150	08/25/87	Abe et al.	210	490	
	4,699,637	10/13/87	Iniotakis	55	158	
	4,810,485	03/07/89	Marianowski	423	648.1	
	4,857,080	08/15/89	Baker et al.	55	16	
	5,139,541	08/18/92	Bend	55	16	
	5,149,420	09/22/92	Buxbaum	205	219	
	5,171,822	12/15/92	Pater	528	188	
	5,215,729	06/01/93	Buxbaum	423	248	
	5,217,506	06/08/93	Bend	55	16	
	5,259,870	11/09/93	Bend	95	56	
	5,332,597	07/26/94	Carolan et al.	427	243	
	5,366,712	11/22/94	Violante et al.	423	248	
	5,393,325	02/28/95	Bend	95	56	
	5,498,278	03/12/96	Edlund	96	11	
	5,518,530	05/21/96	Sakai et al.	96	11	
	5,614,001	03/25/97	Kosake et al.	96	10	
	5,645,626	07/08/97	Edlund et al.	95	56	
	5,652,020	07/29/97	Collins et al.	427	230	
	5,674,301	10/07/97	Sakai et al.	48	61	
	5,738,708	04/14/98	Peachey et al.	95	56	
	5,821,185	10/13/98	White et al.	502	4	
	5,931,987	08/03/99	Buxbaum	95	55	
	5,980,989	11/09/99	Takahashi et al.	427	294	
	6,037,514	03/14/00	White et al.	585	520	
	6,066,592	05/23/00	Kawae et al.	502	439	
	6,183,543	02/06/01	Buxbaum	96	11	
	6,214,090	04/10/01	Dye	95	56	
	6,235,417	05/22/01	Wachsman et al.	429	17	
	6,281,403	08/28/01	White et al.	585	658	
	6,296,687	10/02/01	Wachman	95	55	
	6,350,297	02/26/02	Doyle	95	55	
	6,461,408	10/08/02	Buxbaum	95	55	
	6,475,268	11/05/02	Thornton	96	11	
	6,478,853	11/12/02	Hara et al.	95	56	
	6,547,858	04/15/03	Edlund et al.	96	4	
	6,569,226	05/27/03	Dorris et al.	95	56	

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 APR 23 2004		
ATTY DOCKET NO. 63-03	SERIAL NO. 10/717,218	FILING DATE November 19, 2003
APPLICANT Reddy et al.	GROUP 1724	

		2003/0000387	01/02/03	Uemura	96	11	
		2002/0062738	05/30/02	Yoshida	96	11	
		2002/0020298	02/21/02	Drost et al.	96	11	

## FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation Yes/No

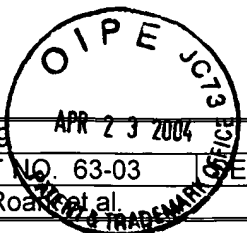
## OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, etc.)

		Amandusson, H. Dissertation No.651, "Hydrogen Extraction with Palladium Based Membranes," Institute of Technology, Linkopings Universitet, Department of Physics and Measurement Technology, Linkoping, Sweden, (Forum Scientum, Linkoping, Sweden, 2000).
		Balachandran, U.; Lee, T. H.; Dorris, S. E., "Development of Mixed-Conducting Ceramic Membrane for Hydrogen Separation," In <i>Sixth International Pittsburgh Coal Conference</i> : Pittsburgh, PA, 1999.
		Balachandran, U.; et al., "Development of Dense Ceramic Membranes for Hydrogen Separation," In <i>26th International Technical Conference on Coal Utilization and Fuel Systems</i> : Clearwater, FL, March 5-8, 2001, pp 751-761
		Balachandran, U.; et al., "Current Status of Dense Ceramic Membranes for Hydrogen Separation," In <i>27th International Technical Conference on Coal Utilization and Fuel Systems</i> : Clearwater, FL, March 3-7, 2002, pp 1155-1165
		Balachandran, U.; et al., M. "Development of mixed-conducting oxides for gas separation," <i>Solid State Ionics</i> 1998, 108, 363-370.
		Balachandran, U.; et al., "Development of Mixed-Conducting Dense Ceramic Membranes for Hydrogen Separation," In <i>Proceedings of the Fifth International Conference on Inorganic Membranes</i> : Nagoya, Japan, 1998.
		Benziger, J. B. (1991) "Thermochemical Methods for Reaction Energetics on Metal Surfaces," in: <i>Metal-Surface Reaction Energetics</i> , Edited by E. Shustorovich, (VCH Publishers, Weinheim, Germany) pp. 53-107.
		Beshers, D. N. (1973) "Diffusion of Interstitial Impurities," in: "Diffusion," (American Society for Metals, Metals Park, Ohio) pp. 209-240.
		Bonanos, N. et al., "Ionic Conductivity of Gadolinium-Doped Barium Cerate Perovskites," <i>Solid State Ionics</i> 1989, 35, 179-188.
		Bonanos, N. "Transport properties and conduction mechanism in high-temperature protonic conductors," <i>Solid State Ionics</i> 1992, 53-56, 967-974.
		Bonanos, N. "Transport Study of the Solid Electrolyte BaCe <sub>0.9</sub> Gd <sub>0.1</sub> O <sub>2.95</sub> at High Temperatures," <i>J. Phys. Chem. Solids</i> 1993, 54, 867-870.
		Bonanos, N. et al. "Perovskite solid electrolytes: Structure, transport properties and fuel cell applications," <i>Solid State Ionics</i> 1995, 79, 161-170.
		Buxbaum, R. E.; Marker, T. L., "Hydrogen transport through non-porous membranes of palladium-coated niobium, tantalum and vanadium," <i>J. Mem. Sci.</i> 1993, 85, 29-38.
		Chary, A. S.; Reddy, S. N. "Effect of Structural Changes on DC Ionic Conductivity of Rubidium Nitrate Single Crystals," <i>Phys. Stat. Sol.</i> 1998, 208, 349-352.
		Heed, B. et al., "Proton conductivity in fuel cells with solid sulphate electrolytes," <i>Solid State Ionics</i> 1991, 46, 121-125.

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



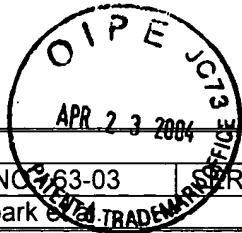
Form PTO-1449	ATTY DOCKET NO. 63-03	SERIAL NO. 10/717,218	FILING DATE November 19, 2003
APPLICANT Roark et al.			GROUP 1724

		Heinze, S.; et al., "Relation between grain size and hydrogen diffusion coefficient in an industrial Pd-23% Ag alloy," <i>Solid State Ionics</i> <b>1999</b> , 122, 51-57.
		Iwahara, H.; et al., "Proton Conduction in Sintered Oxides and its Application to Steam Electrolysis for Hydrogen Production," <i>Solid State Ionics</i> <b>1981</b> , 3/4, 359-363.
		Iwahara, H.; et al., "Proton Conduction in Sintered Oxides Based on BaCeO <sub>3</sub> ," <i>J. Electrochem. Soc.</i> <b>1988</b> , 135, 529-533.
		Iwahara, H.; et al., "High Temperature Solid Electrolyte Fuel Cells Using Perovskite-Type Oxide Based on BaCoO <sub>3</sub> ," <i>J. Electrochem. Soc.</i> <b>1990</b> , 137, 462-465.
		Iwahara, H.; et al., "High-temperature C <sub>1</sub> -gas fuel cells using proton-conducting solid electrolytes," <i>J. Appl. Electrochem.</i> <b>1989</b> , 19, 448-452.
		Iwahara, H. "Oxide-ionic and protonic conductors based on perovskite-type oxides and their possible applications," <i>Solid State Ionics</i> <b>1992</b> , 52, 99-104
		Iwahara, H. et al., "An electrochemical steam pump using a proton conducting ceramic," <i>J. Appl. Electrochem.</i> <b>1996</b> , 26, 829-832
		Kreuer, K. D. et al., "H/D isotope effect of proton conductivity and proton conduction mechanism in oxides," <i>Solid State Ionics</i> <b>1995</b> , 77, 157-162.
		Kreuer, K. D. "On the development of proton conducting materials for technological applications," <i>Solid State Ionics</i> <b>1997</b> , 97, 1-15.
		Kroger, F. A. "Detailed Description of Crystalline Solids; Imperfections," <i>The Chemistry of Imperfect Crystals</i> ; Chapter 7, North Holland Publishing Co.: Amsterdam, <b>1964</b> , pp 192-207.
		Lee, W.; Nowick, A. S. "Protonic Conduction in Acceptor-Doped KTaO <sub>3</sub> Crystals," <i>Solid State Ionics</i> <b>1986</b> , 18/19, 989-993.
		Liang, K. C.; Nowick, A. S. "High-temperature protonic conduction in mixed perovskite ceramics," <i>Solid State Ionics</i> <b>1993</b> , 61, 77-81.
		Lunden, A.; Mellander, B.-E.; Zhu, B. "Mobility of Protons and Oxygen Ions in Lithium Sulfate and Other Oxyacid Salts," <i>Acta. Chem. Scand.</i> <b>1991</b> , 45, 981-982.
		Munch, W.; et al., "A quantum molecular dynamics study of proton conduction phenomena in Ba CeO <sub>3</sub> ," <i>Solid State Ionics</i> <b>1996</b> , 86-88, 647-652.
		Munch, W. et al. J. "A quantum molecular dynamics study of the cubic phase of BaTiO <sub>3</sub> and BaZrO <sub>3</sub> ," <i>Solid State Ionics</i> <b>1997</b> , 97, 39-44.
		Nishimura, C. et al., "Hydrogen Permeation Characteristics of Vanadium-Nickel Alloys," <i>M. Mat. Trans.</i> <b>1991</b> , 32, 501-507.
		Nishimura, C. et al., "V-Ni alloy membranes for hydrogen purification," <i>J. Alloys and Compounds</i> January <b>2002</b> , 330-332, 902-906.
		Norby, T.; Larring, Y. "Mixed hydrogen ion-electronic conductors for hydrogen permeable membranes," <i>Solid State Ionics</i> <b>2000</b> , 136-137, 139-148.
		Norby, T.; Larring, Y., "Concentration and Transport of Protons and Oxygen Defects in Oxides," In <i>Ceramic Oxygen Ion Semiconductors and Their Applications</i> ; Steele, B. C. H., Ed.; The Institute of Materials, <b>1996</b> , pp 83-93
		Norby, T., "Proton Conduction in Oxides," <i>Solid State Ionics</i> <b>1990</b> , 40/41, 857-862
		Peachey, N. M. et al., "Composite Pd/Ta metal membranes for hydrogen separation," <i>J. Mem. Sci.</i> <b>1996</b> , 111, 123-133.
		Shima, D.; Haile, S. M. "The influence of cation non-stoichiometry on the properties of undoped and gadolinia-doped barium cerate," <i>Solid State Ionics</i> <b>1997</b> , 97, 443-445

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Form PTO-1449		
ATTY DOCKET NO. 2003-03	SERIAL NO. 10/717,218	FILING DATE November 19, 2003
APPLICANT Roark et al.		GROUP 1724

		Siriwardane, R. V. Jr., et al., "Characterization of ceramic hydrogen separation membranes with varying nickel concentrations," <i>Appl. Surf. Sci.</i> <b>2000</b> , 167, 34-50.
		Stenzenberger, H.D., "Addition Polyimides," in: <i>Advances in Polymer Science - High Performance Polymers</i> , Vol. 117; Edited by P.M. Hergenrother, (Springer-Verlag Berlin Heidelberg, <b>1994</b> ), pp. 165-220
		Takekoshi, T., "Synthesis of Polyimides," ( <b>1996</b> ) <i>Polyimides Fundamentals and Applications</i> , Chapter 2, (Marcel Dekker, Inc., New York, New York), pp. 7-44.
		Van der Merwe, J.H. (1984) "Recent Developments in the Theory of Epitaxy," in: "Chemistry and Physics of Solid Surfaces V," Edited by R. Vanselow and R. Howe, Springer-Verlag, Berlin, <b>1984</b> ) pp. 365-401.
		Yajima, T.; Iwahara, H. "Studies on behavior and mobility of protons in doped perovskite-type oxides: (I) In situ measurement of hydrogen concentration in $\text{SrCe}_{0.95}\text{Yb}_{0.05}\text{O}_{3-\delta}$ at high temperature," <i>Solid State Ionics</i> <b>1992</b> , 50, 281-286.
		Yajima, T. et al. "Proton conduction in sintered oxides based on $\text{CaZrO}_3$ ," <i>Solid State Ionics</i> <b>1991</b> , 47, 271-275.
		Yamakawa, K. et al., "Hydrogen permeability measurement through Pd, Ni and Fe membranes," <i>J. Alloys and Compounds</i> May <b>2001</b> , 321, 17-23.
		Zhang, Y. et al., "Hydrogen permeation characteristics of vanadium-aluminium alloys," <i>Scripta Materialia</i> November <b>2002</b> , 47, 601-606.
		Zhu, B.; Mellander, B.-E. "Proton conduction in salt-ceramic composite systems," <i>Solid State Ionics</i> <b>1995</b> , 77, 244-249.
		Zhu, B.; Mellander, B.-E. "Proton Conducting Composite Materials at Intermediate Temperatures," <i>Ferroelectrics</i> <b>1995</b> , 167, 1-8.
		Zhu, B. et al. "Structure and ionic conductivity of lithium sulphate-aluminum oxide ceramics," <i>Solid State Ionics</i> <b>1994</b> , 70/71, 125-129.
		Zhu, B. <i>Solid State Ionics</i> <b>1999</b> , "Intermediate temperature proton conducting salt-oxide composites," 125, 397-405.
		Zhu, B.; Mellander, B.-E., "Ionic Conductivities of Nitrate-Based Oxide Materials for Solid State Fuel Cells," In <i>High Temperature Electrochemical Behavior of Fast Ion and Mixed Conductors</i> ; Poulsen, F. W., Bentzen, J. J., Jacobson, T., Skou, E., Ostergard, M. J. L., Eds.: Roskilde, <b>1993</b> , p 495
		Zhu, B.; Mellander, B.-E. "Proton conducting materials based on hydrofluorides," <i>J. Mat. Sci. Lett.</i> <b>2000</b> , 19, 971-973
		Zhu, B. "Applications of hydrofluoride ceramic membranes for advanced fuel cell technology," <i>Int. J. Energy Res.</i> <b>2000</b> , 24, 39-49
		Zhu, B. et al. "Intermediate temperature fuel cells using alkaline and alkaline earth fluoride-based electrolytes," <i>Solid State Ionics</i> <b>2000</b> , 135, 503-512

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.